



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,353	02/12/2004	Kenneth C. Johnson	TWI-30510	5063
28584	7590	07/22/2004	EXAMINER	
STALLMAN & POLLOCK LLP SUITE 2200 353 SACRAMENTO STREET SAN FRANCISCO, CA 94111			TSAI, CAROL S W	
			ART UNIT	PAPER NUMBER
			2857	

DATE MAILED: 07/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/777,353	<b>Applicant(s)</b> JOHNSON ET AL.	
	<b>Examiner</b> Carol S Tsai	<b>Art Unit</b> 2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on 12 February 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-10 is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                                                                 |                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                            | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>02/12/2004</u> . | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 5,844,684 to Maris et al. in view of U. S. Patent No. 6,211,921 to Maris.

Maris et al. disclose a method of evaluating a diffracting structure formed on a semiconductor sample comprising the steps of: including interpolation points and associated theoretical optical response characteristics, each interpolation point corresponding to a sample parameter set and with the associated theoretical optical response characteristics being determined by applying a sample model to each of the parameter sets (see Abstract, lines 13-17; col. 4, lines 29-45; and col. 7, line 59 to col. 8, line 21); measuring the actual optical response characteristics of the sample (see col. 4, lines 46-60 and col. 14, line 51 to col. 15, line 8); and iteratively interpolating between the interpolation points using an interpolation model that defines a substantially continuous function which intersects with the interpolation points in order to derive a set of interpolated optical response characteristics that best fit the actual optical response characteristics to evaluate the sample (see col. 17, line 64 to col. 18, line 9).

Maris et al. do not disclose creating a database.

Maris teaches creating a database (see col. 25, lines 11-18).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maris et al.'s method to include creating a database, as taught by Maris, in order that data can be stored.

As to claim 2, Maris et al. also disclose the optical response characteristics being in the form of one or both of complex reflectance coefficients and scattering matrices (see col. 15, lines 9-22).

As to claim 3, Maris et al. also disclose said optical response characteristics being created and measured as a function of wavelength (see col. 7, lines 52-58).

As to claim 4, Maris et al. also disclose said interpolation model utilizing one or more of linear, multi-cubic, and quadratic functions (see col. 17, lines 6-19).

***Allowable Subject Matter***

3. Claims 5-10 are allowed.

4. The following is a statement of reasons for the indication of allowable subject matter:

U. S. Patent No. 5,844,684 to Maris et al. is the reference closest to the claimed invention. Maris et al. disclose a method of evaluating parameters of a diffracting structure formed on semiconductor samples comprising the steps of: calculating optical response characteristics for selected parameter sets, each set of parameters corresponding to an interpolation point; measuring an optical signal of a sample; and evaluating the parameters of the sample by iteratively fitting the optical signal with the interpolation model. However, Maris et al. do not teach defining a continuous model of the optical responses as a function of the parameters

Art Unit: 2857

that equals the optical responses at the interpolation points; and including all of the other limitations in the respective independent claims.

### ***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Johnson discloses a reduced multicubic database interpolation method.

Seziner et al. disclose alignment accuracy between two or more patterned layers being measured using a metrology target comprising substantially overlapping diffraction gratings formed in a test area of the layers being tested.

Johnson et al. disclose a method of measuring at least one parameter associated with a portion of a sample having formed thereon one or more structures with at least two zones each having an associated zone reflectance property.

Chou et al. disclose a method providing estimations of physical interconnect process parameter values in a process for manufacturing integrated circuits.

Maris discloses a method for characterizing a sample includes the steps of (a) providing a semiconductor material; (b) applying at least one of an electric field, a pulsed or cw light source, a change in temperature and/or a change in pump pulse intensity to the semiconductor material; (c) absorbing pump light pulses in a portion of the semiconductor material and measuring changes in optical constants as indicated by probe light pulses applied at some time  $t$  following the absorption of the pump light pulses; and (e) associating a measured change in the optical

Art Unit: 2857

constants with at least one of a surface charge, dopant concentration, trap density, or minority carrier lifetime.

Nishizawa et al. disclose an interference waveform dispersion spectrum of light reflected from a multi-layer film being compared to a waveform obtained by numerical calculation using an optical characteristic matrix.

Fujita et al. disclose micro-dimensional measurement apparatus including an optical scanning system and a processor for optical data obtained therefrom the measurement being based upon a comparison of previously prepared reference data and optical data from an object to be measured, and features use of a twin laser beam in the scanning operation.

#### ***Contact Information***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol S. W. Tsai whose telephone number is (571) 272-2224. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571) 272-2216. The fax number for TC 2800 is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2800 receptionist whose telephone number is (571) 272-1585 or (571) 272-2800.

In order to reduce pendency and avoid potential delays, Group 2800 is encouraging FAXing of responses to Office actions directly into the Group at (703) 872-9306. This practice may be used for filing papers not requiring a fee. It may also be used for filing papers which require a

Art Unit: 2857

fee by applicants who authorize charges to a PTO deposit account. Please identify the examiner and art unit at the top of your cover sheet. Papers submitted via FAX into Group 2800 will be promptly forwarded to the examiner.

A handwritten signature in black ink, appearing to read "Carol S. W. Tsai". The signature is fluid and cursive, with the first name "Carol" being the most prominent.

Carol S. W. Tsai  
Patent Examiner  
Art Unit 2857

07/16/04